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ABSTRACT

This study addresses the issue of integrating technology into the curriculum. It explores how teachers use technology when they are given inservice training that has been customized to meet the needs of each individual for the integration of technology. The research was conducted in a school district in a suburb of Philadelphia. The three teachers chosen for the study were fourth through sixth grade teachers in their second year of technology integration. The researcher worked with the teachers over a 6-week period, once a week for 45 minutes. The one-on-one workshops focused on the integration of technology into the curriculum and introduced software programs that covered math, language arts, social studies, and an introduction to the Internet. The following types of data were collected by the initial survey to choose candidates: Technology Connection Forms to determine the types and quality of lessons developed, e-mail correspondence between teacher and researcher, teachers' journals, students' journals, one-on-one conversations with teachers, exit surveys, and interviews with peer teachers. This report provides background on the teachers and the workshops and discusses student motivation, administrative support, classroom management, implementation, technology support, and outcomes. (Contains 30 references.) (MES)

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Integrating Technology into the Curriculum

Gaining Confidence With One-on-One Workshops

By Heide Pickens

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In the twenty-first century, the use of technology is raising many questions relating to implementation for students and teachers. Researchers find that teachers are the anchors of technological success in any school. Luke, Moore & Sawyer (1998) suggest several approaches to encourage technology in schools through preservice and inservice. They are quoted saying "build and they will come" (Luke, Moore & Sawyer, 1998, p.56). Luke, Moore, & Sawyer strongly believe many teachers will go to training classes either because it is mandatory, they are curious or they are truly excited about technology. They will come, but will they continuously use technology in the classroom?

Administrators must ask themselves what methods can be used to encourage teachers to stay involved and abreast of new technology, transfer information to students, and integrate technology into the curriculum. The program must be interwoven within the setting of the school's goals. No program will be successful if the principal does not provide support. Teachers need the principal to supply them with time to implement and experiment (Meltzer, 1997). This study examines how integration into the curriculum is impacted when teachers are given an opportunity to come to a series of one-on-one workshops designed to meet their specific needs, learn new software and hardware on a regular basis.

There are many reasons why teachers do not integrate technology into their curriculum. Barker (1994) states four primary reasons why technology has not become a

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part of the classroom curriculum: (1) teacher training has not been provided and they do not have the knowledge to teach the students themselves; (2) teachers do not have the confidence to learn how to use the computers; (3) teachers do not know what software is available to integrate into their curriculum and; (4) teachers have anxiety when using the computers. One of the five summary finding on teachers, technology, and training of Meltzer and Sherman was that technology is a challenge to teachers before it makes their work easier. At first, adding technology to a teacher's classroom makes it a little tougher to teach. There are many challenges that a teacher faces:

- designing lessons
- scheduling students to use the computer
- organizing the classroom
- managing the classroom
- grading the final product

Teacher inservice helps teachers overcome their phobia or computer illiteracy, but it does not help teachers take what they have learned and integrate it into their curriculum (Wentworth, 1998). The key to successful implementation of technology is effective training. School districts and researchers have experimented to find the best model for their situation. Research shows that school districts must have a vision that goes beyond purchasing hardware and software for the schools. Staff development is only a small percentage of the full technology budget. Districts need to set a vision to provide technology leadership with an instructional technology leader for each individual school.

The implementation of a successful technology program does not occur overnight. According to Meltzer and Sherman, it takes three to six years to fully implement

technology-enhanced teaching and learning into the curriculum. Short-term preservice or inservice does not produce any long-term change. There must be time for follow-up sessions, implementation, and discussion with other staff members. The opportunity to discuss what has been presented and share ideas with colleagues is an essential piece of any inservice initiatives.

Some researchers argue that teaching a single course on hardware and software is not the approach for long term gain. A single course does not make the connections to the curriculum. The information is fragmented by the time the teacher takes the course and the information is transferred to the content areas and/or the students. Technology trainers must also keep in mind that they are teaching adult learners. The characteristics of an adult learner are different from those of a child (Farmer, 1998). Farmer identifies adult learners in the following ways: they are experienced learners, they have limited time to learn, they learn according to their interests and needs, they have strong habits, and need to see results quickly.

There are many models of inservice for teachers on the implementation of technology. Educators and administrators must remember that each school is a culture of its own. The students, teachers, and administrators set the tone for that particular school and its successful implementation of technology. The key to success is a supportive administration and a staff educated in technology. This study examined one inservice model and describes what happens when an inservice for teachers has been customized to meet the needs of each individual for integrating technology into the classroom.

Research Design

The research was conducted in a suburb outside of Philadelphia. The school district educates 13,000 students and employs 904 teachers. The district is in Phase Three of its four-phase implementation of technology. Phase One included 220 teachers in elementary grades 4, 5, and 6, secondary English/Reading teachers, and secondary Math teachers. Phase One teachers received four computers each for their classroom. Phase Two included teachers in grade two receiving one computer and teachers in grade three and four receiving four computers. Phase two also provided computers for the following teachers: Secondary Science and Social Studies teachers, high school technology education teachers, Spanish and French foreign language teachers, business education teachers, and special education teachers. The remaining phases will implement technology in all areas of the district. This study concentrated on the elementary school environment.

At the time of this study, each elementary school classroom, Kindergarten through Sixth grade, received one to four computers, a printer, a thirty-two inch monitor, a remote keyboard, and one VCR to share with their grade partners. There were also two digital cameras, two scanners, two zip drives, a camcorder, and a LCD monitor per school. Libraries were networked since the 1999-2000 school year and all classrooms were networked by November 2000. The Fourth through Sixth grade classrooms had this equipment in their classrooms one year prior to the Kindergarten through Third grade classrooms. **All** teachers were given technology training during the first phase, whether they had computers or not. The training was on an inservice day with teachers pulled out into large classroom workshops.

This study addressed the issue of integrating technology into the curriculum. It explored how teachers use technology when they are given inservice training that has been customized to meet the needs of each individual for the integration of technology. The teachers who were chosen for this study were teachers from the fourth through sixth grade classroom. These teachers were in their second year of technology integration and were chosen through the use of a survey.

The study took place over a six-week period in the winter of 2000. A follow-up study was made the following fall to determine the level of integration. The researcher was a third grade teacher as well as the Technology Trainer at an elementary kindergarten through sixth grade building. This position included supporting teachers with technology, providing inservice training in the building and for the district, conducting workshops for teachers every Tuesday morning, distributing and ordering software, and helping teachers integrate technology into their curriculum on an as-needed basis.

This researcher worked with three teachers, once a week, for forty-five minutes. The training took place in the Gifted Resource Room, which houses four computers when the room is available (Because the resource teacher was out of the building every Monday and Friday the room was available for this purpose). Two substitutes were needed to cover the classrooms. One substitute covered the researcher's classroom for a half day. The second substitute rotated to each of the three teachers' classrooms as they participated in the training. A period of fifteen minutes was given to allow the substitute to move to each classroom. This fifteen-minute period allowed the researcher to make notes regarding the last inservice and prepare for the next inservice.

Format of Workshop

The researcher and each teacher discussed the goals of the district related to technology and the goals and responsibilities of the workshops. The district stressed using fundamental teaching practices to provide rich opportunities for learning and understanding "what they look like". The Language Arts strand had undergone change and was stressed in this district. Therefore, the curriculum integration for this study included Language Arts. It was expected that, when the workshops were completed, all teachers would have created a lesson or lessons to integrate into their curriculum, shared and implemented what they have learned with other teachers in their building, and continue to implement technology on an ongoing basis in their classroom.

During their common planning time, the researcher and each teacher worked on a one-on-one-basis most of the time. The teachers shared what they had learned with their grade level. This allowed for sharing of information and ideas. This was and is one of the most valuable assets for teachers. The researcher and the teachers discussed the following questions. As this information was discussed, the ideas were recorded on the brainstorming function of the program Inspiration.

- What curriculum do you cover?
- What skills and concepts do you teach?
- Which of these is the most important?
- How would you prioritize the list?

These questions encompassed all the time in the first session of the workshop.

The second session addressed these concepts.

- Is there one of the three skills or concepts that lends itself to technology integration?

- Can technology help you teach that particular concept or skill in a different way?
- How can technology be integrated in that particular lesson?

After the results were determined, the researcher and the grade level teachers researched the particular software that was discussed. They also looked for other ways to integrate technology into their curriculum. Communicating with e-mail was encouraged between the researcher and the grade level teachers. Teachers kept a log of ideas they generate through the week. A log was also kept by the computer for students to sign in and describe the assignments they completed.

The third workshop was set aside to share ideas the grade level teachers had gathered over the week. The next step was to investigate and build a lesson using the technology and the skills/concepts that they determined during the second session. The format or template for this lesson called the Technology Connections Form was outlined in the school district's faculty handbook (Appendix 1).

The fourth session was devoted to discussing the lesson outlined in the previous week. Individual teachers took the lesson and personalized it according to their needs and learning styles. That particular lesson was then implemented into their curriculum. The teachers wrote a Technology Connections Form for the lesson and share it with other teachers and the researcher (See Appendix 1).

Teachers decided on a particular skill or concept to investigate for the next meeting and prepared a lesson template. Questions that they asked themselves before the next meeting included:

- When and how did they implement the lesson?

- Where are other places in the curriculum that this type of technology can be effective?
- In what areas of technology do they still need guidance and/or improvement?
- What technology tools would make them a more effective teacher and improve student learning?

Teachers brought their previous year's lesson plans with them to the next meeting. The researcher and the grade level teacher identified lessons where technology could be implemented, discussed how it was to be implemented, analyzed how it improved student learning, and decided whether it made them more effective teachers. If time allowed, the team and researcher continued to develop lessons in the areas that were needed depending upon the allotted time determined by the school district.

Data were collected in a variety of forms and from a variety of sources. During the first year, the following instruments and contacts were used:

- Initial survey to choose candidates
- Technology Connection Forms to determine the types and quality of lessons developed.
- E-mail correspondence between teacher and researcher
- Teacher's Journal
- Students' Journals
    - What projects were students assigned on the computer?
    - How was technology used?
- One-on-one conversations with teachers
- Exit survey

- Interviewing the grade level teacher's peer teachers
    - How are peer teachers using technology?
    - Are they integrating technology into the curriculum?
- Have they used lessons developed by the grade level teacher?
- Has the triangulation between researcher, grade level teacher, and peer teacher benefited student learning and integration of technology into the curriculum?

During the next fall semester the following questions were asked:

- What integration is taking place in the grade level teacher's and peer teacher's classrooms?

Each session was recorded and transcripts were made for each session. The researcher asked each teacher to keep a journal to record questions or comments. The information gathered helped determine the effectiveness of teachers using technology after they were given inservice training customized to their needs.

Workshops Begin

As teachers became more comfortable with the computer they began to use new programs and to integrate them into their curriculum. Teachers began learning information that was important to them and that could be used as a tool. Giving them time to explore programs without interruption allowed them to learn at their own pace according to their own learning style. In the classroom teachers are often interrupted and "...kids are always hovering over you", noted Taylor. The workshop gave teachers time to explore on their own, making mistakes as well as discoveries. Teachers want a non-threatening environment in which to practice and apply what they have learned (Hurst, 1994).

Volunteers

Three teachers volunteered their time for this study. Dick is a twenty-eight year veteran of teaching. He has two grade partners. Each teacher teaches a homeroom class, language arts, and their specialty, which is science, social studies, or math. Dick teaches the math component. Dick is willing to implement new programs into his classroom if and only if he finds them of value. Using the stock market game on the Internet brought value into his curriculum. "Especially in moral occupations like teaching, the more one takes the risk to express personal purpose, the more kindred spirits one will find. Paradoxically, personal purpose is the route to organizational change" (Fullan, page 2).

Taylor teaches fifth grade and has been teaching for thirty years. She teaches all components of her curriculum. Taylor was uncomfortable with computers when the workshops began. She volunteered for the workshops to become more technology literate. When the workshops started, Taylor felt frustration with technology. Teachers were given computers and told that this now must become one of their tools within their classroom. Taylor had a phobia about computers and did not feel she was doing enough. "I should be doing more than what I am doing", she said and "I guess I have to stop beating myself up over that." She became so frustrated in a group workshop the previous year that she walked out. Barker suggests that hands-on-experience is the single most valuable activity to overcome computer phobia (Barker, 1994). Many educators are not afraid of the computer, but of their own ignorance and lack of understanding.

Scarlet has been teaching for seven years. She is currently a fourth grade teacher and works with two grade partners. Scarlet began the workshop to gather ideas on how to integrate computers into her curriculum. She is young, busy, and needed to know

where technology fit. There were often times where she had difficulties keeping materials together and being prepared for the next workshop. Scarlet needed to be motivated to use technology in her classroom. She found motivation from outside sources. The school district followed the national standards and expected the teachers to implement them into their classroom. The time came several weeks into our workshop when parents questioned the amount of time students were using the computers in her classroom. Scarlet became motivated, focused, and implemented technology in several areas of her curriculum. She also shared the information she learned with her grade partners and they implemented it into their curriculum also.

Workshops

The workshops focused on integrating technology into the curriculum. The software programs introduced covered math, language arts, social studies and an introduction to the Internet. As the teachers participated in the workshops, I found there was so much to learn on every program it just took a while to become proficient. Taylor said, "What I am seeing looks interesting. How am I going to find time and still accomplish what needs to be done?"

As we discussed integrating technology into the curriculum, I stressed the fact that technology should be used as a tool. We first focused on what they teach and tried to find programs that enhanced the curriculum. The software the teachers learned included:

Inspiration	Timeliner
Math Blaster-PreAlgebra	Explore and Express
Math Blaster- Calculating Crew	How the West Was 1+2X3

Fraction Attraction	Mighty Math Number Heros
Zoobeanies	Microsoft Outlook
Oregon Trail	*Power Point*

The software was not to be used to add to their curriculum. The software was intended to replace off-computer activities. Places that the technology would fit became quite apparent as each workshop began to take shape.

I found organization was important if teachers were to use the workshop effectively and for implementation into their classroom. If the teachers did not prepare for the workshop, time was spent retracing what they needed to do. Being prepared for the workshop as well as reviewing the software was also important to the lesson. Taylor realized that if she did not practice with the software herself it often was not conducive to her teaching. "I was not able to show him (a student) how to do research on it (Timeliner) so it was a little anti-climatic". Taylor found out a little too late that Timeliner was not a research tool, but a tool to organize dates and information.

Motivation

Motivating students to use the computers was not a factor. Students were very interested in knowing what was being done. Taylor found, "Once you have eight on a computer nobody will pay attention to anything else. I can find activities for them to do, but it is getting them [the rest of the class] to concentrate". This was a novelty for students, but as the computers were used more and more in the classrooms this became less of a problem. Scarlet mentioned that "students have been having a good time." Taylor found as she used computers more frequently in her classroom, "I was really pleased that the students were done in the amount of time I expected" and students began

exploring and sharing what they learned with others. Scarlet was excited when her students found out on their own and taught her how to make a smiley face on the computer using Word.

Administrative Support

Teachers were motivated to use the time they were given to find ways technology could be implemented into their curriculum. They were treated as professionals and given the time to learn during their workday. Luke, Sawyer, & Moore (1998) feel teachers will be better prepared to pass their knowledge to students if they are given appropriate preservice and inservice education. It was a common occurrence to see the principal observe the classrooms and the workshops. Meltzer (1997) mentioned in the review of the literature that principals must run interference for teachers as they learn, experiment, and implement technology. The principal's visits and her support for the program showed support for the teachers. She would stop by the workshop, observe, and learn during her visits. The principal would ask what the teacher was learning. Scarlet was learning the software program called Timeliner. Scarlet noted, "What's really neat is that they actually have activities for the children after they read the story." Scarlet explained the story she would be reading and how Timeliner fit in perfectly.

The principal always asked for a demonstration. During one visit a teacher was working on the program Inspiration. The teacher taught the principal how the program works. The following morning she used the program during a staff meeting. That was a powerful example of implementation for the teachers.

The principal's involvement increased the level of importance and concern for the teachers. They were proud to share information with the principal regarding the way they integrated technology into the curriculum.

Classroom Management

Classroom management was a big concern and took on many phases. Teachers first needed to become comfortable with students working on different projects in their classroom. Sharing ideas and visiting other classrooms gave teachers a foundation to work from. Students also found a period of time where they had to learn how to manage different activities. Scarlet found, "I'm with a small group, but the only problem is that until they feel comfortable with the computer I am going to be running back and forth between my groups and the people at the computer because they need more guidance." As the students became more comfortable this problem subsided.

Implementation

Dick implemented math software programs into his curriculum. He used them as a review and had great results, but decided... "next year I will use the [software] program to teach the concept." He also typed comprehensive quizzes on the computer, used the Swarthmore Internet site for his math class, used the stock market game, and had students write paragraphs persuading others to invest in particular stocks.

Taylor found Encarta very valuable when conducting research. She also found Math Blaster an asset to her math program and shared the information with her grade partners. Each partner wanted the program loaded on the computer to be used on the same day. Unfortunately, at this time, we did not have enough CD's in the building to make this possible. Taylor also used Timeliner to place the events of the Civil War in

order. Taylor became very comfortable with the technology she was learning. She was introduced to the program Inspiration during her workshop and left at 2:15 to go back to her class. By 3:30, I had a copy of how the students used Inspiration with their curriculum in my mailbox.

Scarlet was able to integrate her language arts program with her social studies unit. The program Explore and Express included activities for the book she was reading called Sarah Plain and Tall. This also fit nicely with the program Oregon Trail. Scarlet shared this information with her grade partners during their planning time. All of the teachers implemented what Scarlet had learned into their lessons. Students also used the computers in the morning for a daily editing activity correcting incorrect sentences. She integrated technology with her science unit by taking digital pictures of the structures the students built and then having them write personal narratives about the project.

Teaching teachers how to use the technology does not mean that they will implement what they have learned in their classrooms. One teacher had a very slow start and needed to hear the concerns of parents regarding the lack of computer use in her classroom in order to find a reason to begin. Computers have proven not to be an option, but an integral part of education in the twenty-first century. Meltzer (1997) mentioned that it takes three to six years to fully implement technology-enhanced teaching and learning into the curriculum.

As the teachers became more familiar with the programs, they began using the computers more frequently in their classrooms. They averaged five students on the computer per day over a nine-week period. Some days they had thirteen students on the computers while other days they had as few as two or three. Dick's stock market game

required that each group of four students check their stock on the Internet each day. The stock market game included all three math classes in the grade level (Dick taught math for the entire sixth grade.) The students looked forward to checking their stocks on the Internet each day. The winner of the stock market game was a group of students in Dick's lower level math group. It gave these students the opportunity to compete with others and feel successful.

Dick found it difficult to give equal opportunity to all students to work on the computers because he only had four in his classroom. He also made use of the three computers in the library. This still seemed insufficient to him. This is just one of several frustrations that often comes with technology. As the workshops continued teachers became more comfortable with integrating technology into their curriculum. Giving teachers the time and tools empowers them to succeed.

Technology Support

Each building in the district has a part-time technology aide to work with the technology trainer. The job of the technology aide is to maintain the hardware of the computers and troubleshoot problems that occur. Our technology aide was a source of help and support when the teachers had questions regarding their hardware/software and needed an extra hand with helping students outside the classroom when using the computers.

The building was not provided with a computer lab. Teachers often used classrooms that were not occupied, but needed an adult to guide the students with their projects. The technology aide also came into the classroom to introduce programs to the students. Her dedication to the teachers and students helped them feel more at ease about

their new adventure with technology. She was a resource for Dick during the six-week period of the stock market game. The system was often down and students had difficulty checking their stocks. Having another person to trouble shoot these problems as the class waited was valuable. Education must continue in an organized manner whether technology is accessible or not.

Outcomes

Teachers, as well as students, have different learning styles and must be given the time to learn the topic. We do not hand students a book and say learn it. Professionals also need time to learn what they need to teach. At the conclusion of the workshop, teachers felt more comfortable with computers. Taylor said, "I feel that I am certainly a lot more aware of things I can do and I am much more aware of the software. I am not really intimidated by even working with it with the kids". Dick added, "I can't believe how I was reluctant to go on the computer. I do two things when I get home. Open the mail; as a matter of fact, I don't even do that first. I go to the computer."

The following school year the teachers were interviewed halfway through the year to see how they had been integrating technology into their curriculum. This information was gathered through monthly status reports and a post-workshop interview. The teachers were asked to use the logbooks again, but they did not keep detailed records of lengths of time or frequency of use. So the consistency of integration could not be determined.

The first question asked how the teachers used the computers in the classroom. Their responses included: daily edits (students correct incorrect sentences), search for facts on the Internet regarding structures, timelines, games for remembering capitals of

states, math programs for review, making greeting cards for their reading buddies, Encarta, e-mail, Microsoft Word, Oregon Trail, and the stock market information. Other comments made were the frustration with hardware because of the undependable computers. The printers do not work well or properly all the time. These problems were compounded when they occurred after the part-time technology aide left for the afternoon. Taylor said, "The kids find their home computers more useful than the ones here." Printers are inconsistent and continue to be an ongoing problem within the classroom. One classroom teacher wanted to print information from a disk and traveled to four classrooms until she found a printer that worked.

The teachers were also asked what they do this year that they learned in the workshop. Dick said, "It is easier for me to find things since I took the workshop. ...going to different websites for my own teaching use and better knowledge." Taylor remarked, "I use basic skills and confidence I gained from it. I learned not to be so hard on myself about computer skills and I learned how to e-mail." Taylor had a difficult time when she was in a group workshop the previous year. She became frustrated and walked out. She took the initiative to find her weakness and volunteered for this workshop and would being willing to attend more workshops with this format.

Teachers were asked what they needed at this point. The teachers felt the four computers were great to have in their classrooms, but they also needed a lab to teach students as a whole class. Scarlet mentioned, "Students need to become proficient with entering their password, logging on to the computer, getting into different programs, and using keyboarding skills. A technology class for students will help a lot." Taylor was also in agreement with Scarlet. Taylor said, "Students should work as a group (whole

class instruction) and then apply it in the classroom situation." Valuable class time should not be taken to reteach students what they had learned previously in a teacher-guided session. The classroom should be used for application.

Not all students have access to computers at home. Some students are proficient because they have computers and others struggle with the simple skills. This gap is widening and should be addressed. Each teacher suggested that a computer lab with an instructor must be added as one of the student's special classes (other special classes include art, gym, and music). "A ton of kids know a lot and others know very little. Time would be better spent if they start early and have them learn keyboarding. I wouldn't want to give up access to computers in my room either," Dick noted.

Teachers also need to continue their education regarding technology. Scarlet shared several ideas for future workshops which included "grade level inservices where groups can work as a team to come up with activities for the curriculum and learn new programs, early dismissal once a month for teachers to work together, more than a half-hour pullout spent learning new programs, brainstorming ideas, troubleshooting, and more training and more time for teachers to work together to come up with ideas to integrate technology into the curriculum." Technology is here to stay and the teachers feel they need the continued support to stay abreast of changing technology and integrating it into their curriculum. The one-on-one workshop individualized that for them and prepared them with a good foundation for success.

Conclusion

Research supports the idea that teaching a single course on hardware and software is not the approach for long-term gain and implementation. In this workshop setting,

teachers were given support to begin taking risks and implement technology into their curriculum. They were given opportunities to come to a one-on-one workshop setting to meet their particular needs and learn new pieces of software and hardware on a regular basis. The teachers were treated as professionals and given the time to explore what they had to learn to meet state standards.

Teachers were taught to introduce new material to students using a KWL (What do you *know*, What do you *want* to know, and What have you *learned*). The KWL helps the teachers to design their lesson to meet the needs of the students. Teachers used Bloom's Taxonomy to further stimulate students thinking skills. Teachers and administrators often forget the basics of teaching when it comes to themselves. Teachers are often given the tools and told to implement it. Teachers need to be given the same time not only to become proficient themselves, but to become knowledgeable enough to implement the state standards into their curriculum.

One-on-one workshops focused on what the teachers knew already, what they wanted to know, and what they learned. Each workshop became unique according to the teacher's needs. Initially using a graphic organizer to determine what the teacher does already in the classroom helped determine direction. Using this information they knew the direction they needed to go to implement technology into their curriculum. Fullan (1993) noted, "On the one hand, schools are expected to engage in continuous renewal, and change expectations are constantly swirling around them. On the other hand, the way teachers are trained, the way schools are organized, the way the educational hierarchy operates, and the way political decision makers treat educators results in a system that is

more likely to retain the status quo." The one-on-one workshop was a step toward that goal.

Each of the volunteers felt empowered by what they had learned. They came in the next year prepared and ready to integrate technology and make changes within their curriculum. Dick had the students graph the results of the stock market game and integrated language arts by having the students write about their best and worst stock and what changes could have been made. Scarlet rotated her math class through the computer to work on multiplication facts, searched on the Internet for facts on structures, played games for remembering the capitals and states, and researched animals on Encarta. Taylor conducted science research, math practice, and used programs on an on-going basis that integrated with her curriculum, such as Oregon Trail.

Teachers were less apprehensive about finding areas on their own to research for their classroom. They also felt less intimidated working with students at the computer. Giving teachers the appropriate training and guidance gave the tools to succeed in the classroom.

Recommendation

The training should not stop here. Inservices must be given to allow the teachers to hone their skills as technology continues to move quickly in many directions. Fran Karanovich, a superintendent of the Stanford, Illinois, School District, commented that "How many students will leave our schools not knowing all they could have known, because we couldn't give our teachers sufficient training in a timely manner?" (Poftak, 2001, p.4.)

One-on-one workshops gave the individual teachers the skills they needed when they needed them, and it continued as they shared their wealth of knowledge with their colleagues. As educators we know that people will learn best if they apply information and teach others. When teachers share information with their colleagues, they learn the information more completely, and they also shape it to meet their particular needs. Teachers are always asking for more time to process and apply what they have learned. Sharing with others involves taking ideas that have been tried and proven to work, and using those ides to integrate new information into the curriculum. Sharing information with colleagues provides an opportunity to introduce an activity immediately and receive feedback from peers. This can make the learning activity presented in a workshop more valuable for a teacher. When teachers are provided with the proper training and time they become empowered to implement what they learned, continue their commitment, and make the investment students deserve.

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